SpecFUEL is a Fuel, Not a Solid Waste, Pursuant to 40 C.F.R. Part 241

Waste Management's (WM) SpecFUEL™ is a state-of-the-art engineered fuel designed to be burned in energy recovery units capable of burning coal, petroleum coke, or biomass. SpecFUEL is manufactured by processing non-hazardous post-consumer, post-commercial, and post-industrial materials extracted from the municipal waste stream through 13 distinct and actively managed steps. The resulting product has a high Btu value, is a valuable product (and uniformly managed as such), and has contaminant levels below or comparable to those of traditional fuels. Thus, SpecFUEL meets the criteria set forth by the Environmental Protection Agency (EPA) in 40 C.F.R. Part 241 to qualify as a fuel when combusted, rather than a solid waste on its own merit and consistent with prior EPA interpretations. However, to avoid any uncertainty, WM has requested a comfort letter memorializing that customers can burn SpecFUEL in units that are regulated under Section 112 of the Clean Air Act (CAA), and, in turn, SpecFUEL's use should not trigger the application of any standards under Section 129 of the CAA.[1] This White Paper presents the legal arguments supporting the treatment under Section 112 and explains why any other conclusion would be inconsistent with both the letter of the regulations and various prior EPA interpretive statements and decisions applying the regulations.

I. Introduction

The distinction between fuel and solid waste is based on criteria established by EPA in the Non-Hazardous Secondary Materials (NHSM) rule issued pursuant to the Resource Conservation and Recovery Act (RCRA). Under the approach adopted by EPA, "traditional fuels" such as fossil fuels and their derivatives are never solid wastes when combusted. Fuels produced from "non-hazardous secondary material" are deemed fuels—and thus not solid waste—in certain specified circumstances:

> The following non-hazardous secondary materials are not solid wastes when combusted: …
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> (4) Fuel … products that are used in a combustion unit, and are produced from the processing of discarded non-hazardous secondary materials and that meet the legitimacy criteria specified in paragraph (d)(1) of this section, with respect to fuels…. The legitimacy criteria apply after the non-hazardous secondary material is processed to produce a fuel….

40 C.F.R. § 241.3(b)(4). SpecFUEL is manufactured from non-hazardous municipal solid waste augmented by non-hazardous commercial and industrial materials such as high Btu, hard-to-recycle plastic. These materials are by definition "secondary materials." *Id.* § 241.2. Thus, the two remaining factors that must be considered in establishing SpecFUEL as a non-waste fuel, not a solid waste, are: (1) whether "processing" of the raw secondary materials occurs; *id.* §241.2;

[1] EPA has been willing to provide written clarifications and responses to specific requests for determinations from industry, *see* http://www.epa.gov/wastes/nonhaz/define/, and WM similarly has requested it do so here.

and (2 whether the so-called "legitimacy criteria" are met; *id.* §241.3(d)(1).As explained in detail below, SpecFUEL satisfies both of these criteria. In brief:

- The raw ingredients undergo 13 distinct "processing" steps, including sorting, shredding, metal and other contaminant removal, sizing, recombining and pelletizing, that transforms them into a homogeneous blend of paper and cardboard fiber and plastic that can effectively substitute for coal, petcoke, or cellulosic biomass, while emitting less pollution.

- The final product then satisfies the "legitimacy criteria" because it is managed as a valuable commodity, it has a meaningful heating value well in excess of EPA's minimum guidance value, and its contaminant levels compare favorable to that of coal, petcoke, and biomass.

As a point of clarification, this paper accounts for the fact that the Agency granted partial reconsideration of the original NHSM rule that it promulgated in 2011, and issued a pre-publication final rule amending the NHSM rule in December 2012 with subsequent publication in the Federal Register on February 7, 2013.[2] However, those amendments have little impact on the fundamental analysis here, as discussed below.

<u>II. "Processing"</u>

SpecFUEL is a highly processed material that both satisfies the literal definition of "processing" standing on its own merit and compares favorably to other fuels that EPA has concluded have undergone processing. EPA defines "processing" as:

> [A]ny operations that transform discarded non-hazardous secondary material into a non-waste fuel…. Processing includes, but is not limited to, operations necessary to: Remove or destroy contaminants; significantly improve the fuel characteristics of the material, e.g., sizing or drying the material in combination with other operations; chemically improve the as-fired energy content…. Minimal operations that result only in modifying the size of the material by shredding do not constitute processing for purposes of this definition.

40 C.F.R. § 241.2.

Upon examination of the sophisticated SpecFUEL manufacturing process, it is evident that SpecFUEL is processed within the meaning of this definition. The raw secondary material is "transformed"[3] through multiple actively managed steps into a "non-waste fuel." Those steps accomplish the following goals:

[2] *See* 78 Fed. Reg. 9,112 (Feb. 7, 2013).

[3] The plain meaning of "transform" is "a : to change in composition or structure; b : to change the outward form or appearance of; c : to change in character or condition : convert." http://www.merriam-webster.com/dictionary/transform.

- They significantly improve the fuel characteristics of the product by removing materials that have a low Btu value or high moisture content such as inert materials, metals, and organic materials;

- They remove contaminants that could negatively effect the emissions profile of the product, including metal and polyvinyl chloride (PVC);

- They size and shred the materials both to allow the final product to be matched to customer specifications and to eliminate a fraction of the material that is unsuitable for fuel use; and

- They include final processing to remove fines and other impurities, and to blend and pelletize the material into a uniform size and shape for consistent, controlled combustion.

In all, there are 13 distinct steps to the process, and several steps accomplish more than one goal (for a detailed description of these 13 steps, see Attachment 1). The process requires sophisticated equipment and skilled operators in a controlled production enviroment. The net result is a final product that is highly-processed and tailored to meet customer specifications. It is approximately 99% or greater post-recycle paper and cardboard fiber and plastic, and it is highly homogeneous and uniform with consistent heating value, chemical makeup, moisture content, contaminant levels, and dimensions.

This degree of processing thus satisfies the intent and the letter of EPA's regulatory definition of "processing." At the same time, the process is by no means comparable to the "[m]inimal operations that result only in modifying the size of the material by shredding," *id.* § 241.2, that EPA does not consider by itself to be sufficient processing. Although shredding is part of an element of the 13 steps involved in the production of SpecFUEL, the contrast between SpecFUEL and mere shredding of municipal solid waste is stark in terms of the complexity of overall processing, Btu value, chemical composition, and SpecFUEL's ultimate physical form and properties:

- As indicated above, EPA in discussing shredding appeared to be envisioning a system where only simple shredding occurred before combustion. In contrast, SpecFUEL is the carefully managed end product of a sophisticated and actively managed 13-step process, of which some shredding comprises merely a part of the 13 steps.

- Raw municipal solid waste has a low Btu value (*e.g.*, ~4300 Btu/lb; *see* http://msw.cecs.ucf.edu/EnergyProblem.pdf), is heterogeneous, and contains many contaminants that are not suitable for combustion (such as metal, inert, and organic waste) and that could negatively impact emissions (such as PVC). Shredded municipal solid waste is simply not sufficiently processed to make it capable of being fired in units designed for traditional fuels.

- SpecFUEL has a relatively high Btu value (*e.g.,* ~9300 Btu/lb, based on recent sampling[4]), is homogeneous, does not contain metal, PVC, and other contaminants in significant concentrations, and is actively processed specifically for the purposes of being able to be fired in units that use traditional fuels.[5]

SpecFUEL is, in fact, even more processed that some other materials that EPA has already said are likely to or do meet the definition of "processing," including:

- *Construction and demolition (C&D)-derived wood*. In the preamble to the NHSM rule, EPA focused on removal of contaminants and sizing of the material as the hallmark characteristics of processing: "C&D-derived wood is typically sorted to remove contaminants (e.g., lead-painted wood, treated wood, non-wood materials), and size reduced prior to burning, *producing material that likely meets the processing and legitimacy criteria for contaminants*." 76 Fed. Reg. 15,456, 15,485 (March 21, 2011) (emphasis added) (this point was repeated in the preamble to the December 2012 amended NHSM rule).

- *Pulp and paper sludges*. After first noting that merely dewatering pulp and paper sludge would not be sufficient processing, EPA went on to address pelletizing in the preamble to the NHSM rule: "However, if the pelletizing process is used to process the sludge into a form that improves its fuel value, we would agree that this is indicative of fuel activity (similar to pelletizing sewage sludge, which was used as an example of sufficient processing in Section VII.D.4 of the proposed rule) *and we would consider those activities to meet the definition of processing*." *Id.* at 15,488 (emphasis added).

- *Tire-derived fuel (TDF).* TDF has been the subject of significant discussion, and in the amended rule EPA provided that tires in some circumstances are never a solid waste. But with regard to tires that are disposed in landfills or otherwise, EPA has also focused on sizing and removal of contaminants: "EPA agrees with the commenter who stated that *TDF that has been chipped/shredded, sorted and dewired (or at least 90%+ wire free) would be considered sufficiently processed*. However, this may not be the only standard, to the extent that other unit types require different levels of metal removal." *Id.* at 15,498 (emphasis added).

- *Coal combustion residuals (CCRs).* "[W]e are aware of at least one electric utility that recovers ash from ponds or landfills and then separates this secondary material into its fundamental components: carbon, silicates, and high-density, iron-rich materials. A coarse carbon-fuel product is then recovered by density separation using concentrating spirals. A fine carbon-fuel product is also recovered with flotation cells.

[4] SpecFUEL can be engineered to have a Btu value of between 7,500 and 11,000 Btu/lb by varying the ratio of paper and cardboard fiber to plastic when the separate materials are combined into the final product, per each customer's specifications.

[5] SpecFUEL is also very different from refuse-derived fuel (RDF), as discussed in more detail in Section IV, below, and in Attachment 3.

> *We believe that this type of processing operation is likely to meet our definition of processing, as it appears that these operations in fact remove contaminants and improve the fuel characteristics of recovered CCRs*." *Id.* at 15,513 (emphasis added).

To summarize, EPA has indicated the performing some combination of a *subset* of the following activities would constitute processing: sorting; sizing; removing contaminants; pelletizing; and improving the fuel characteristics of the material. The SpecFUEL process includes *all* of these activities.

Recent EPA determination letters further support the conclusion thatSpecFUEL satisfies EPA's definition of processing. For example, EPA provided International Paper Products Corporation a letter agreeing that IPPC's "Enviro-Fuelcubes" (EFCs) are not solid waste when burned as fuel. *See* http://www.epa.gov/wastes/nonhaz/define/pdfs/paper.pdf. EPA notes that the raw materials (paper, fabrics, plastics, textiles, non-C&D wood, and packaging materials) are inspected and sorted to remove metal, batteries, trash, and commodity-grade recyclables; are blended and sheared; and then are compressed into dense cubes. In EPA's view: "*Based on this description—that is, removal of contaminants along with blending, size reduction, and densification, we believe the process used to produce EFCs meets the definition of processing in 40 C.F.R. 241.2.*" *Id.* at 2 (emphasis added). Likewise, in a letter to Resource Enterprises, LLC, EPA addresses an engineered fuel product used as a coal replacement. The feedstock materials include industrial biogenic materials such as biogenic filter cake, charcoal and demolition wood; off-spec product materials such as juice wrappers, alcohol wipes and hand cleaners; and industrial byproduct materials such as non-asbestos shingles, non-PVC plastics, and dewatered industrial sludge. *See* http://www.epa.gov/epawaste/nonhaz/define/pdfs/Lhoist-engineered-fuels.pdf. In approving the processing of these materials into the engineered fuel, EPA identifies many of the same steps used in the SpecFUEL process, including contaminant removal, blending, shredding and screening, analysis and storage. *Id.*

EPA's recent determination in response to a request from ReCommunity regarding its proposed "ReEngineered Feedstock" fuel—to be manufactured from municipal solid waste, commercial waste, and industrial waste—is also relevant and supportive of SpecFUEL as satisfying the definition of fuel. *See* http://www.epa.gov/wastes/nonhaz/define/pdfs/ReCommunityLetterAugust24.pdf. There, EPA found that the processing proposed by ReCommunity would be sufficient, as it constituted "a sophisticated process that essentially involves extracting a product from a waste." *Id.* at 2. This is a key component of the SpecFUEL process too. Moreover, EPA endorsed the "objectives" of the requestor, which were to "1) maximize the effectiveness, scope, and financial viability of a single stream recycling process, and 2) engineer a homogenous fuel that is consistent over time with contaminant levels equivalent to substitute fuels, that provides meaningful heating value, and that controls emissions." *Id.* This applies equally to what Waste Management has done through a similar process using similar raw non-hazardous secondary materials.

In addition to the above, there are various other illustrative examples in EPA's database. *See, e.g.*, http://www.epa.gov/osw/nonhaz/define/pdfs/fiber-polymer-nhsm.pdf ("Based on this description—that is, pre-shredding and pre-mixing to improve the fuel characteristics, removing metal to reduce contaminants, further mixing and re-shredding the feedstock materials to improve the fuel characteristics of the finished material thereby achieving a specified BTU range, and pelletizing the finished material into a homogenous fuel product for use in coal-fired stoker boilers as a replacement for coal, we believe the definition of processing in 40 C.F.R. § 241.2 has been met"); http://www.epa.gov/osw/nonhaz/define/pdfs/oil-filter-fluff.pdf (shredding of used oil filter medium together with removal of free oil and metal is sufficient processing).

In sum, SpecFUEL easily meets the definition of "processing," and any other conclusion would be arbitrary and capricious in light of existing EPA statements and determinations.

III. Legitimacy Criteria

SpecFUEL also satisfies all three of EPA's "legitimacy criteria." In addition to being processed, EPA requires the following criteria be met to satisfy the definition of fuel:

> (i) The non-hazardous secondary material must be managed as a valuable commodity based on the following factors:
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> (A) The storage of the non-hazardous secondary material prior to use must not exceed reasonable time frames;
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> (B) Where there is an analogous fuel, the non-hazardous secondary material must be managed in a manner consistent with the analogous fuel or otherwise be adequately contained to prevent releases to the environment;
>
> (C) If there is no analogous fuel, the non-hazardous secondary material must be adequately contained so as to prevent releases to the environment;
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> (ii) The non-hazardous secondary material must have a meaningful heating value and be used as a fuel in a combustion unit that recovers energy.
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> (iii) The non-hazardous secondary material must contain contaminants or groups of contaminants at levels comparable in concentration to or lower than those in traditional fuel(s) which the combustion unit is designed to burn. In determining which traditional fuel(s) a unit is designed to burn, persons may choose a traditional fuel that can be or is burned in the particular type of boiler, whether or not the combustion unit is permitted to burn that traditional fuel. In comparing contaminants between traditional fuel(s) and a non-hazardous secondary material, persons can use data for traditional fuel contaminant levels compiled from national surveys, as well as contaminant level data from the specific traditional fuel being replaced. To account for natural variability in contaminant levels, persons can use the full range of traditional fuel contaminant levels, provided such comparisons also consider variability in non-hazardous secondary material contaminant levels. Such comparisons are to be based on a direct comparison of the contaminant levels in both the non-hazardous secondary material and traditional fuel(s) prior to combustion.

40 C.F.R. § 241.3(d)(1) (as amended by the December 2012 amendments to the NHSM rule, which revised subparagraph (iii)).

First, SpecFUEL is a valuable commodity, which is purchased as fuel by third-party customers and is managed as such. The product is generally only stored for a short time (1-3 days prior to shipment) and is contained in covered storage units prior to shipment.[6] It is transported by truck, rail, or barge to customers who generally manage it as fuel and use it quickly (for example, within a week). Thus, the total storage time prior to use is wholly consistent with traditional fuels. EPA has not defined "reasonable time frame" but rather indicated that it will be determined on a case-by-case basis. *See, e.g.*, 76 Fed. Reg. at 15,540. Here, the relatively short durations discussed above and the consistency of these time frames with use of traditional fuels demonstrates the reasonable timeframe by which SpecFUEL is managed as a valuable commodity. *See also http://www.epa.gov/wastes/nonhaz/define/pdfs/ReCommunityLetterAugust24.pdf* at 5 (finding "prompt" delivery and use of a similar product to be a reasonable time frame).

Second, SpecFUEL has a high heating value and its reason for existence is to be sold to customers for use as a fuel in energy recovery units in lieu of combusting one or more traditional fuels. As noted above, the heating value of SpecFuel can be engineered to be between 7,500 and 11,000 Btu/lb. WM obtained daily composite samples during five consecutive days of SpecFUEL production from January 23 through January 27, 2012 to analyze heating value and make contaminant comparisons to traditional fuels.[7] The heating value of the fuel over the five-day period averaged approximately 9,300 Btu/lb, which is more then double the value of unprocessed municipal solid waste (approximately 4,300 Btu/lb) and that of refuse-derived fuel (RDF).[8] Likewise, SpecFUEL's heating value is nearly double EPA's "meaningful heating value" benchmark of 5,000 Btu/lb. *See, e.g.*, 76 Fed. Reg. at 15,512 ("for purposes of meeting the legitimacy criteria for fuels, we would consider non-hazardous secondary materials with an energy value greater than 5,000 Btu/lb, as-fired, to have a meaningful heating value, and satisfy this legitimacy criterion").[9] At the lower end of the range (7,500 Btu/lb), SpecFUEL's heating value is comparable to that of cellulostic biomass, *see, e.g.*, http://cta.ornl.gov/bedb/pdf/BEDB4_ Appendices.pdf at Appendix A, which is by definition a "traditional fuel." At the high end of the range (11,000 Btu/lb), it is comparable to that of bituminous coal. In other words, the heating value of SpecFUEL is meaningful, in that it is similar to that of the traditional fuels that it is intended to replace and well above EPA's benchmark of 5,000 Btu/lb.

Potential users of SpecFUEL include industrial manufacturers (e.g., cement, chemicals, pulp and paper) that use solid fuel-fired boilers or kilns, and institutional and utility solid fuel-

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[6] Storage indoors meets the definition of "contained" in 40 C.F.R. § 241.2. SpecFUEL is a solid that will not be released into the environment if contained in structure. Given that the process of pelletizing the material creates a plastic film around the pellets, the final product is very stable and not readily susceptible to disintegration or fugitive release into the environment when stored or transported.

[7] The daily composite samples were shipped to a National Environmental Laboratory Accreditation Conference (NELAC)-certified laboratory for analysis.

[8] For reference, Attachment 3 summarizes the key differences between SpecFUEL and RDF.

[9] EPA has subsequently applied the 5,000 Btu/lb benchmark several times. *See, e.g.*, http://www.epa.gov/wastes/nonhaz/define/pdfs/paper.pdf at 3; http://www.epa.gov/wastes/nonhaz/define/pdfs/ReCommunity LetterAugust24.pdf at 5.

fired boilers that produce energy or steam. SpecFUEL can be used to augment or replace coal, petroleum coke or wood biomass. Because SpecFUEL burns cleaner than these solid traditional fuels, it offers users a cost-effective tool for reducing pollutant and GHG emissions while also contributing to landfill diversion. SpecFUEL is thus specifically intended to be "used as a fuel in a combustion unit that recovers energy."

Finally, SpecFUEL has contaminant levels that are lower than or comparable to the traditional fuels that it is designed to replace. To compare SpecFUEL to traditional fuels, WM reviewed EPA's guidance under the March 21, 2011 NHSM Rule and the preamble and proposed amendments issued December 23, 2011. WM also reviewed several EPA references in the NHSM Rule docket including EPA document, "Contaminant Concentrations in Traditional Fuels: Tables for Comparison" issued November 29, 2011 and all EPA NHSM comfort letters posted on the Agency website. WM reviewed all potential contaminants (i.e., all 188 Hazardous Air Pollutants and nine CAA Section 129 pollutants as specified in the 40 CFR 241.2) and incorporated the guidance proposed and subsequently finalized in the NHSM Rule amendments regarding inclusion of nitrogen and exclusion of specific contaminants in its analyses.[10] WM evaluated all HAP metals and halogens, and a broad range of the semi-volatile and volatile organic contaminants from the list of potential contaminants. Consistent with the proposed and promulgated clarifications to legitimacy criteria of 40 C.F.R. § 241.3(d)(1)(iii), WM included comparative analyses of grouped metals, halogens, semi-volatile and volatile organics.

In response to questions from the Agency, WM provided supplemental information and analysis supporting a comparison of antimony grouped as a low-volatile metal, a comparison of fluoride grouped as a total halide and information relating to bis(2-ethylhexyl)phthalate (DEHP), an organic HAP. Agency staff agreed with WM's conclusion that SpecFUEL has contaminant levels that are lower or comparable to the traditional solid fuels, and that the grouping analysis WM performed was consistent with the clarifications proposed and subsequently finalized in the NHSM Rule amendments.

Tables summarizing and illustrating the favorable comparison of SpecFUEL to the traditional fuels it is designed to replace (coal, petroleum coke and wood & biomass) are set forth as Attachment 2.[11]

IV. Municipal Solid Waste May Be Processed Into a Fuel Product under the NHSM Rule

The requirements of 40 C.F.R. Part 241 identified above are the only requirements applicable to determining that SpecFUEL is a non-waste fuel product. While the CAA contains a definition of "municipal waste," which is used in conjunction with standards applicable to municipal waste incinerators, *see* 42 U.S.C. § 7429(a)(1)(B) & (g)(5), and EPA regulations contain CAA-based (not RCRA-based) definitions of "municipal solid waste" and "refuse-derived fuel," 40 C.F.R. § 60.1465, none of those definitions is legally or factually relevant here.

[10] 76 Fed. Reg. at 18,475.

[11] This is only a summary. More detailed data was previously provided to EPA. *See* Attachment 4 for a list of items previously provided to EPA.

As EPA has said: "EPA agrees … that *municipal waste may be processed into a product fuel under the NHSM rule framework* and that a material determined to be a legitimate product fuel under the NHSM Rule 'cannot be considered RDF.'" Summary of Public Comments and Responses for Commercial and Industrial Solid Waste Incineration Units: Reconsideration and Final Amendments; Non-Hazardous Secondary Materials That Are Solid Waste: Final Rule: Volume 2: NHSM (2013) ("NHSM Reconsideration Response to Comments") at 71 (emphasis added).

First and foremost, the CAA does not link the definition of "solid waste incineration unit" in any way to the definition of "municipal waste." *See* 42 U.S.C. § 7429(g)(1) & (g)(5). Instead, Congress very specifically defined "solid waste," for purposes of Section 129 of the CAA, as having "the meaning[] established by the Administrator pursuant to [RCRA]." *Id.* § 7429(g)(6). The D.C. Circuit in *NRDC v. EPA*, 489 F.3d 1250 (D.C. Cir. 2007), held that Congress meant what it said in § 7429(g)(1): that a solid waste incineration unit is one that "combusts *any solid waste*…." Thus, the threshold question is whether the material combusted is "solid waste" under a RCRA-based definition established by EPA. Stated differently, the statutory definition of "municipal waste" and the regulatory definitions of "municipal solid waste" and "refuse-derived fuel" that were developed for the standard applicable to municipal waste combustors under Section 129 of the CAA are irrelevant to the SpecFUEL determination under RCRA.

EPA already has addressed this issue as a matter of interpretation in the NHSM rulemaking. Among other arguments, one commenter argued (1) that "Section 129(g)(1) makes clear that Congress viewed refuse-derived fuel as waste," and (2) that "Congress's definition of 'municipal waste' expresses the intent that facilities that burn non-fossil fuels … must meet the section 129 incinerator standards." EPA replied as follows:

> If any or all of the commenter's contentions are correct, section 129 would not provide that the term ''solid waste'' shall have the meaning promulgated by EPA under RCRA. There would simply be no reason for EPA to consider the RCRA definition, since section 129 would take care of the issue. Section 129(g)(6) would be meaningless.

76 Fed. Reg. at 15,470. In its supporting response to comments document, EPA takes the same position with respect to "municipal waste" and "refuse-derived fuel," ultimately finding that "Some fuels may be processed from solid waste, but that determination by the Agency stands or falls based on the RCRA statute and case law, not the CAA." *See* Responses to Comments Document for the Identification of Nonhazardous Secondary Materials That Are Solid Waste Rulemaking (February 2011) at 37 (emphasis added).[12] Thus, whether or not SpecFUEL could

[12] *See also id.* ("EPA is establishing a definition of non-hazardous solid waste, which, as specified by CAA section 129(g)(6), governs the meaning of 'solid waste' under section 129. Because Congress specifically directed that 'solid waste have the meaning established by the Administrator under RCRA, instead of defining the term under RCRA, the CAA definition of 'municipal waste' is not relevant to this action."… "The comment is incorrect that section 129, by excluding 'refuse-derived fuel' from the exclusion in 129(g)(1)(B) was somehow defining the term as being included in the term, 'solid waste,' under RCRA. Again, if that were the case, section 129(g)(6) would be superfluous."). EPA recently reiterated this point. *See* NHSM Reconsideration Response to Comments at 71-72 ("This is a formulation that EPA has rejected, since there would be no point in providing that the Agency should determine whether material is a waste under RCRA.").

be considered "municipal waste," "municipal solid waste," or "refuse-derived fuel" is not determinative of whether it is a non-waste fuel under RCRA.

Second, in any event, SpecFUEL is fundamentally different from municipal solid waste and refuse-derived fuel and therefore could not be considered as such. First, the significant differences between SpecFUEL and shredded MSW are identified and discussed in Section II, above. Second, SpecFUEL and RDF are also completely different. Amatrix comparing and contrasting SpecFUEL and RDF on six different issues is set forth as Attachment 3. In brief, RDF is quite inferior to SpecFUEL in terms of its consistency, contaminant content, fuel and combustion characteristics and ease of use. RDF pellets or fluff is heterogeneous and minimally processed to remove non-combustibles. RDF is unable to meet SpecFUEL's performance standard of 1% or less contamination by unsuitable fuel materials (e.g., inert, metals, wet organics) or trace contaminants (*e.g.*, chlorine) in fuel mix. RDF has a maximum heating value of 6,500 Btu/lb., which is significantly lower than the lowest Btu value exhibited by SpecFUEL due to contamination by inert and wet materials. SpecFUEL is manufactured to a specific heating value between 7,500-11,000 Btu/lb, based on the customer's combustion unit firing diagram. RDF will typically have highly unpredictable moisture (15-35 wt%) and ash (8-25 wt%) content, while SpecFUEL is processed to within five percent of a customer's specification for moisture and ash (with moisture varying between 5-15 wt% and ash between 2-15 wt%). Unlike SpecFUEL, the chlorine content of RDF cannot meet customer's standards as there are no controls to identify and reject PVC in processing systems. Chlorine content, in RDF typically ranges up to two percent while the SpecFUEL plant's spectroscopic equipment can engineer the fuel product to meet a performance specification for chlorine levels ranging from non-detect to 0.3 percent.

Furthermore, RDF processing, unlike the far more extensive SpecFUEL processing, does not include the potential addition of fuel enhancing agents, such as calcium hydroxide for acid gas scrubbing, or lignin, which is used to adjust the oxidation rate and improve fuel handling. RDF is not regularly sampled for heat value, contaminant content, or other key parameters. By contrast, SpecFuel is continuously sampled and analyzed, including with near infrared/spectroscopic/ hyper spectral imaging system (NIR/HIS) equipment, giving customers assurance of a consistent product and confirming that product specifications are met. Use of RDF requires extensive combustion unit fuel feed system modifications by end-users while boilers and kilns using SpecFUEL do not. Finally, SpecFUEL is not subject to the standard for municipal waste combustion units at 40 C.F.R. Part 60, Subpart AAAA, and is not combusted at such facilities.

V. Conclusion

For all of the reasons discussed above and in the materials provided to EPA by Waste Management (*see* Attachment 4), SpecFUEL is manufactured by "processing" raw non-hazardous secondary materials into an engineered fuel product that meets all of EPA's legitimacy criteria. Therefore, it is a non-waste fuel when combusted, and EPA should make a written determination confirming that conclusion.

ATTACHMENT 1

Summary Of The 13-Step SpecFUEL Process

Process Stage 1: Removal of Undesirable Bulky Items

- Presorting is conducted on the inbound tip-floor to remove bulky materials deemed unsuitable for the SpecFUEL product (i.e. tires, mattresses, post-consumer carpet, etc).
- Process stage 1 is completed using excavators and wheel loaders.

Process Stage 2: Removal of Large Metal Objects

- Metal detectors on the in-feed belt, prior to primary shredding, are designed to detect and eject large metallic items contained within non-transparent containers and bags.

Process Stage 3: Slow-Speed, High Torque, Primary Pre-Shredding

- Pre-shredding is used to break up the raw materials producing a homogeneous material suitable for further mechanical processing.
- Raw materials are reduced to 12-inch minus dimensional size.

Process Stage 4: Ferrous Metal Extraction

- This first extraction step of the process removes ferrous metal objects using an over belt magnet.
- Over belt magnets are located at four additional extraction points in the process to maximize ferrous metal recovery.
- All ferrous metal extracted from the raw material stream is recycled.
- Total metal extraction and recovery for recycle (ferrous & non-ferrous) represents ~5 % of the total raw material mass balance.

Process Stage 5: Organics Screening

- All materials ≤2-inches (primarily food, other wet organics) are extracted in the screening process to improve the fuel characteristics of the end-product, SpecFUEL.
- The organic screening stage removes 20 – 30% of the total raw material mass, to promote consistent, high heating value in final fuel product.
- WM’s long-term goal is to digest and convert the extracted organics into alternative energy and compost products.

Process Stage 6: Three Stage Air Classification

- The three stage classification system represents the heart of the engineering process, and is designed to separate and categorize the remaining raw materials into three material categories based upon weight density (heavy, medium and light weight density).
- The two categories of materials considered suitable as SpecFUEL feedstock are those that have been classified and extracted as medium and light weight density materials.
- Heavy weight density materials are not considered suitable feedstock for SpecFUEL (e.g., aggregates, glass, textiles, rubber, etc.).
- The majority of this heavy weight density material is inert and is extracted to be land disposed as there are no recycling options.
- The medium and light weight materials represent ~50 – 55% of the raw material mass balance.

- Light-weight material is primarily plastics (e.g., film); medium-weight is largely paper, cardboard, and rigid plastics.
- Controlled particulate matter air scrubbers are integral to the air classification system and eliminate dust within the negative-air controlled confines of the processing plant.

Process Stage 7: Eddy Current (Non-Ferrous Metal Extraction)

- Medium and light weight density materials extracted in the air classification process step are next exposed to electromagnets (eddy current) to remove non-ferrous metals for recycling.

Process Stage 8: Near Infrared (NIR) Spectroscopic/Hyper Spectral Imaging System (HIS) Sorting

- As a final processing and extraction step, the medium and light weight density materials are routed through NIR / HIS sorting equipment for two distinct processing steps:
  1. First the NIR / HIS equipment is programmed to identify and eject PVC materials to ensure chlorine removal.
  2. Second the NIR / HIS identifies and creates a data log of all SpecFUEL material components, by material percentage i.e., biogenic fiber and plastic.
- Chlorine removal is a critical step, altering the chemical composition of the final product to improve fuel characteristics. This step is a key element of the process, distinguishing it from other processes.
- The technology is sophisticated enough to provide granular data on plastic content by resin type and percentage, as well as by biogenic fiber components.
- The NIR / HIS scanners are designed to record up to 27-million detections/second at a 320 pixel resolution.

Process Stage 9: SpecFUEL Fine Tuning

- SpecFUEL feedstock materials are proportionately recombined to achieve desired fuel formulation to meet customer solid fuel specifications for heat content; also, biogenic composition may be changed to meet customer specifications by adding select clean materials.
- Fine tuning chemically improves the as-fired energy content of the fuel product.
- WM is testing addition of binding and scrubbing materials to enable adjustment of biogenic content and enhance emissions characteristics of the fuel product.

Process Stage 10: High Speed Shredding

- SpecFUEL raw material is shredded to < 2–inch minus particle size and proportionately recombined to produce a uniform BTU fuel.
- The feedstock material is then mechanically conveyed to the fuel production plant.

Process Stage 11: SpecFUEL Raw Material Staging/Drying as needed

- SpecFUEL raw material component commodities staged, and dried as needed prior to engineered fuel manufacturing processing step.

Process Stage 12: Final Tramp Material Removal

- Prior to fuel production, the SpecFUEL feedstock is processed through one final extraction step to ensure elimination of tramp metal materials (< 1-inch minus) that could damage the fuel production equipment.

Process Stage 13: SpecFUEL Production

- SpecFUEL is produced in cylinder form with a highly consistent size ($^7/_8$-inch diameter X 1 to 2-inch length).
- Average weight density = 810 lbs/YD^3 (30 lbs/FT^3)
- The system is capable of producing 4-6 tons/hour per production unit.
- SpecFUEL is stored in an enclosed, covered storage unit for generally 1-3 days before being transported to the customer via truck, rail or barge with the supporting SpecFUEL material safety data sheet (MSDS).

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ATTACHMENT 2

Summary of Comparative Contaminant Data

Table 1. SpecFUEL Comparison to Coal and Biomass for Organic HAPs, Metals, Halides

	SpecFUEL *all results reported as moisture free *all results pooled from all 7 samples				Coal			Wood and Biomass		
		Range		90% UPL Results*	Range		Reference	Range		Reference
	Average	Low	High		Low	High		Low	High	
Halides										
Bromide (mg/kg)	6.27	4.90	6.80	6.8***	0.04	160	(3)	--	--	--
Chloride (mg/kg)	2032.86	1840	2250	2250***	n.d.	9080	(1)	n.d.	5400	(1)
Fluoride (mg/kg)	891.57	585	1070	1159	n.d.	4900	(1), (3)	n.d.	490	(1), (2)
Total Halides (mg/kg)	**2930.70**	**2429.90**	**3326.80**	**3416**	**0.04**	**14140**		**0**	**5890**	
Volatile Compounds (µg/kg)										
Benzene (HAP)	--	--	--	[illegible]	n.d.	38000	(1)	--	--	--
Ethyl benzene (HAP)	45.4	38.0	54.8	54.5	700	5400	(1)	--	--	--
Formaldehyde (HAP)	5029	3300	6300	6900	--	--	--	1600	27000	(1)
Isopropylbenzene (HAP)	17.4	12.2	24.6	23.8	--	--	--	--	--	--
m,p-Xylenes (HAP)	59.9	44.0	85.6	83.6	--	--	--	--	--	--
o-Xylenes (HAP)	33.2	20.2	49.6	49.0	--	--	--	--	--	--
Total Xylenes	--	--	--	--	4000	28000	(1)	--	--	--
Methylene chloride (HAP/OH)	55.3	27.4	143.0	111.6**	--	--	--	--	--	--
n-Hexane (HAP)	--	--	--	--	--	--	--	--	--	--
Phenol (HAP)	--	--	--	--	--	--	--	--	--	--
Styrene (HAP)	313.0	240.0	422.0	405.1	1000	26000	(1)	--	--	--
Tetrachloroethylene (HAP/OH)	8.00	8.00	8.00	--	--	--	--	--	--	--
Toluene (HAP)	35.63	17.80	89.00	70.04**	8600	56000	(1)	--	--	--
Total Volatile Compounds (µg/kg)	**5596.33**	**3707.60**	**7176.60**	**7698**	**14300**	**153400**		**1600**	**27000**	
Semi-Volatile Compounds (µg/kg)										
Bis(2-ethylhexyl)phthalate (HAP)	731571	240000	1410000	1423994	--	--	--	--	--	--
Naphthalene (HAP)	226.57	101.00	566.00	491.9**	--	--	--	--	--	--
Total Semi-Volatile Compounds (µg/kg)	**731798**	**240101**	**1410566**	**1424486**	--	--		--	--	--
Polycyclic Aromatic Hydrocarbons (µg/kg)										
16-PAH	--	--	--	--	6000	253000	(1)	--	--	--
PAH (52 extractable)	--	--	--	--	14000	2090000	(1)	--	--	--
Total Polycyclic Aromatic Hydrocarbons (µg/kg)	**--**	**--**	**--**	**--**	**20000**	**2090000**		--	--	--
Total Organic HAPs (mg/kg)	**737**	**244**	**1418**	**1432**	**34**	**2243.4**		**2**	**27**	

* All 90% UPL Results reported as Normal
** 90% UPL Result reported as Lognormal
*** 90% UPL Result Non-Parametric
n.d. = Non-Detect
-- = No Data

Resources:
1: EPA Letter "Contaminant Concentrations in Traditional Fuels: Tables for Comparison." November 29, 2011.
2: EPA Letter to Joseph Knapik- International Paper Products Corporation. October 5, 2011.
3: USGS Coal Database; http://energy.er.usgs.gov/coalqual.htm (all data based on coal from U.S.)

Table 2. SpecFUEL Comparison to Pet Coke and Biomass for Metals, Halides

	SpecFUEL *all results reported as moisture free *all results pooled from all 7 samples				Wood and Biomass			Petroleum Coke		
		Range		90% UPL Results*	Range		Reference	Range		Reference
	Average	Low	High		Low	High		Low	High	
Metals (mg/kg)										
Antimony (HAP)	29.10	16.90	51.40	46.2	n.d.	26	(1)	0.14	3	(3),(4)
Arsenic (HAP)	0.61	0.61	0.61	--	n.d.	298	(1)	1.08	17.3	(3),(4)
Beryllium (HAP)	--	--	--	--	n.d.	32	(1), (2)	0.05	0.05	(3)
Cadmium (HAP)	0.60	0.34	1.37	1.139**	n.d.	17	(1)	n.d.	n.d.	n.d.
Chromium (HAP)	15.17	10.30	20.60	23.34**	n.d.	340	(1)	1.35	114	(3),(4)
Cobalt (HAP)	1.09	0.78	1.38	1.4	n.d.	213	(1)	0.41	0.45	(3)
Lead (HAP)	21.69	12.30	45.00	40.4	n.d.	340	(1)	0.71	125	(3),(4)
Manganese (HAP)	38.49	34.00	47.20	46.0	n.d.	15800	(1)	5.6	550	(3),(4)
Mercury (HAP)	0.20	0.05	0.28	0.3	n.d.	1.1	(1)	0.001	0.5	(4)
Nickel (HAP)	2.86	1.72	7.24	7.24***	n.d.	540	(1)	52	787	(3),(4)
Selenium (HAP)	1.15	1.03	1.28	1.3	n.d.	66	(1), (2)	n.d.	n.d.	n.d.
Total Low Volatile Metals (mg/kg)[6]	**87.31**	**64.31**	**128.43**	**124.2**	**n.d.**	**17249**		**n.d.**	**1471.8**	
Total Metals (mg/kg)	**110.95**	**78.03**	**176.36**	**167.3**	**n.d.**	**17673.1**		**n.d.**	**1597.3**	
Halides										
Bromide (mg/kg)	6.27	4.90	6.80	6.8***	--	--	--	n.d.	6.3	(3),(4)
Chloride (mg/kg)	2032.86	1840	2250	2250***	n.d.	5400	(1)	7	3000	(5)
Fluoride (mg/kg)	891.57	585	1070	1159	n.d.	490	(1), (2)	1.1	1.2	(3)
Total Halides (mg/kg)	**2930.70**	**2429.90**	**3326.80**	**3416**	**0**	**5890**		**8.1**	**3007.5**	

* All 90% UPL Results reported as Normal
** 90% UPL Result reported as Lognormal
*** 90% UPL Result Non-Parametric
n.d. = Non-Detect
-- = No Data
NA - Not applicable; PAH's accounted for in testing of Volatile Compounds and Semi-Volatile Compounds

Resources:
1: EPA Letter "Contaminant Concentrations in Traditional Fuels: Tables for Comparison." November 29, 2011.
2: EPA Letter to Joseph Knapik- International Paper Products Corporation. October 5, 2011.
3: Obtained Pet Coke Sample Analyzed by a NELAC Certified Laboratory.
4: Bosco, M.L., et al. "Case study: Inorganic pollutants associated with particulate matter from an area near a petrochemical plant." Environmental Research 99 (2005) 18-30. Table 3
5: National Risk Management. "Control of mercury emissions from coal-fired electric ulility boilers: interim report including errata dated 3-21-02" Prepared for OAQPS. Table A-10.
6: Low Volatile Metals as defined in 40 CFR 63.1219(e)(4)

Table 3. SpecFUEL Comparison to Pet Coke and Biomass for Organic HAPs

	SpecFUEL *all results reported as moisture free *all results pooled from all 7 samples				Wood and Biomass			Petroleum Coke		
		Range		90% UPL Results*	Range		Reference	Range		Reference
	Average	Low	High		Low	High		Low	High	
Volatile Compounds (µg/kg)										
Benzene (HAP)	--	--	--	--	--	--	--	--	--	--
Ethyl benzene (HAP)	45.4	38.0	54.8	54.5	--	--	--	--	--	--
Formaldehyde (HAP)	5029	3300	6300	6900	1600	27000	(1)	--	--	--
Isopropylbenzene (HAP)	17.4	12.2	24.6	23.8	--	--	--	--	--	--
m,p-Xylenes (HAP)	59.9	44.0	85.6	83.6	--	--	--	--	--	--
o-Xylenes (HAP)	33.2	20.2	49.6	49.0	--	--	--	--	--	--
Total Xylenes	--	--	--	--	--	--	--	--	--	--
Methylene chloride (HAP/OH)	55.3	27.4	143.0	111.6**	--	--	--	--	--	--
n-Hexane (HAP)	--	--	--	--	--	--	--	--	--	--
Phenol (HAP)	--	--	--	--	--	--	--	--	--	--
Styrene (HAP)	313.0	240.0	422.0	405.1	--	--	--	--	--	--
Tetrachloroethylene (HAP/OH)	8.00	8.00	8.00	--	--	--	--	--	--	--
Toluene (HAP)	35.63	17.80	89.00	70.04**	--	--	--	--	--	--
Total Volatile Compounds (µg/kg)	**5596.33**	**3707.60**	**7176.60**	**7698**	**1600**	**27000**		--	--	--
Semi-Volatile Compounds (µg/kg)										
1-Methylnaphthalene	n.d.	n.d.	n.d.	n.d.	--	--	--	n.d.	1680	(2)
2-Methylnaphthalene	n.d.	n.d.	n.d.	n.d.	--	--	--	4240	4730	(2)
Anthracene	n.d.	n.d.	n.d.	n.d.	--	--	--	n.d.	1990	(2)
Benzo(a)anthracene	n.d.	n.d.	n.d.	n.d.	--	--	--	6780	8360	(2)
Benzo(a)pyrene	n.d.	n.d.	n.d.	n.d.	--	--	--	6530	8160	(2)
Benzo(g,h,i)perylene	n.d.	n.d.	n.d.	n.d.	--	--	--	5730	7290	(2)
Bis(2-ethylhexyl)phthalate (HAP)	731571	240000	1410000	1423994	--	--	--	n.d.	n.d.	n.d.
Chrysene	n.d.	n.d.	n.d.	n.d.	--	--	--	8720	10900	(2)
Dibenz(a,h)anthracene	n.d.	n.d.	n.d.	n.d.	--	--	--	3780	4880	(2)
Indeno(1,2,3-cd)pyrene	n.d.	n.d.	n.d.	n.d.	--	--	--	2010	2390	(2)
Naphthalene (HAP)	226.57	101.00	566.00	491.9**	--	--	--	2040	2280	(2)
Phenanthrene	n.d.	n.d.	n.d.	n.d.	--	--	--	3380	4200	(2)
Pyrene	n.d.	n.d.	n.d.	n.d.	--	--	--	4530	5720	(2)
Total Semi-Volatile Compounds (µg/kg)	**731798**	**240101**	**1410566**	**1424486**	--	--	--	47740	62580	--
Polycyclic Aromatic Hydrocarbons (µg/kg)										
16-PAH	NA	NA	NA	NA	--	--	--	NA	NA	NA
PAH (52 extractable)	NA	NA	NA	NA	--	--	--	NA	NA	NA
Total Polycyclic Aromatic Hydrocarbons (µg/kg)	--	--	--	--	--	--	--	--	--	--
Total Organic HAPs (mg/kg)	**737**	**244**	**1418**	**1432**	**1.6**	**27.0**		**47.7**	**62.6**	
Total Organic HAPs (mg/kg) - Without DEHP	**5.8**	**3.8**	**7.7**	**8.2**	**1.6**	**27.0**		**47.7**	**62.6**	

* All 90% UPL Results reported as Normal
** 90% UPL Result reported as Lognormal
*** 90% UPL Result Non-Parametric
n.d. = Non-Detect
-- = No Data
NA - Not applicable; PAH's accounted for in testing of Volatile Compounds and Semi-Volatile Compounds

Resources:
1: EPA Letter "Contaminant Concentrations in Traditional Fuels: Tables for Comparison." November 29, 2011.
2: Obtained Pet Coke Sample Analyzed by a NELAC Certified Laboratory.

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ATTACHMENT 3

Summary of Differences Between SpecFUEL and RDF

SpecFUEL™	Refuse Derived Fuel (RDF)
Highly Uniform Composition: The SpecFUEL process results in a consistent fuel composed of 99+ percent paper and plastic content. Control of unsuitable materials enhances combustion, allows fuel to burn evenly and completely with minimal to no spikes	**Heterogeneous Composition:** Minimally processed to remove contaminants and non-combustibles. Whether in pellet of fluff form, RDF is unable to meet a standard of 1% or less contamination by unsuitable materials (inert, metals, wet organics) or contaminants (e.g., chlorine) in fuel mix. Tends to burn unevenly with spikes.
Fine-Tuned Heating Content: The SpecFUEL process is designed such that operators can adjust the ratio of paper and plastic to within 10% of the customer specification. This ratio correlates directly to heat content and is a parametric measure of the heat content of the SpecFUEL. Btu/lb adjusted between 7,500-11,000 based on customer specs.	**Minimal Processing/No Fine-Tuning of Heat Content:** Unrefined, heterogeneous material mix results in uncontrolled combustion, heating and emission spikes. Cannot be fine-tuned to meet customer specifications. Btu/lb ranges between 5,500-6,500 depending upon contamination by inert and wet organic materials.
Well-Controlled Moisture/Ash Content: Processed to within 5% of customer specifications by engineering feedstock components and/or heating process. Moisture (wt%) 5-15, Ash (wt%) 2-15	**Highly Variable Moisture/Ash Content:** Highly unpredictable moisture (wt%) 15-35, Ash (wt%) 8-25. Extensive fuel feed system modifications required of end-user
High-Tech Chlorine Removal: The spectroscopic analyzer and sorting system allows WM to control the SpecFUEL chlorine content to within 0.1 percent over the course of weekly production. Chlorine content non-detect to 0.3%	**Uncontrolled Chlorine Contamination:** RDF pellets or fluff generally cannot guarantee chlorine content as there are no controls to identify and reject PVC in processing systems. Chlorine content can range from 0.3% to 2.0%
Fuel Enhancing Agents: The SpecFUEL process allows for customized fuel formulations with the addition of fuel enhancing agents such as calcium hydroxide (acid gas scrubbing) or lignin (adjust pellet structure – adjust oxidation rate and improve pellet handling process)	**No Process Controls for Customization:** RDF is not manufactured to meet customer specifications, RDF is minimally processed for disposal in MSW combustion facilities
Clean Burning Fuel Easily Used in Coal-Fired Boilers/Kilns: Burns cleaner than solid fossil fuels, MSW and RDF, significantly reducing emissions of criteria pollutants and GHGs. End users need not make significant modifications to fuel feed or combustion units.	**Higher Emissions, Requires Extensive System Modification:** RDF has much higher ash, moisture, chlorine, sulfur content causing significantly higher emissions than SpecFUEL. Use of RDF requires extensive combustion unit and fuel feed systems.

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ATTACHMENT 4

List of Documents Provided to EPA
In Support of the Comfort Letter Request

February 15, 2012, Power Point Briefing package, “Introduction to the WM Organic Growth, Inc. SpecFUEL™Program

March 16, 2012, Request for a Comfort Letter, Non-Waste Fuel Determination for WM Process Engineered Fuel (SpecFUEL)

May 4, 2012, Power Point Briefing package for Janet McCabe, DAA OAR, “Introduction to SpecFUEL”

May 4, 2012, Regulatory Analysis for SpecFUEL

May 2012, Waste Management SpecFUEL – Product Stream Energy and Emissions Analysis, prepared for WalMart and Environmental Defense Fund

August 3, 2012, WM SpecFUEL Process-Product Specifications

August 9, 2012, Assessment of Potential Dioxin/Furans Emissions

August 30, 2012, Power Point Briefing package for Robert Perciasepe, DA, “WM SpecFUEL”

September 7, 2012, SpecFUEL Metals & Halides Comparison to Traditional Fuels

October 17, 2012, SpecFUEL Comparative Information for Antimony, Fluoride and DEHP

November 16, 2012, SpecFUEL Additional Comparative Information for SpecFUEL, Pet Coke and Wood/Biomass